Earth-Wise Guide To

Cisterns

Catching and Using Rainwater

What is a cistern?

Cisterns are containers that hold rainwater collected from hard surfaces, most often from roofs. Cisterns come in a wide range of styles and sizes.

(Note: A **rain barrel** is a well-known type of small cistern. This guide provides guidance on large cisterns.)

How does a cistern help?

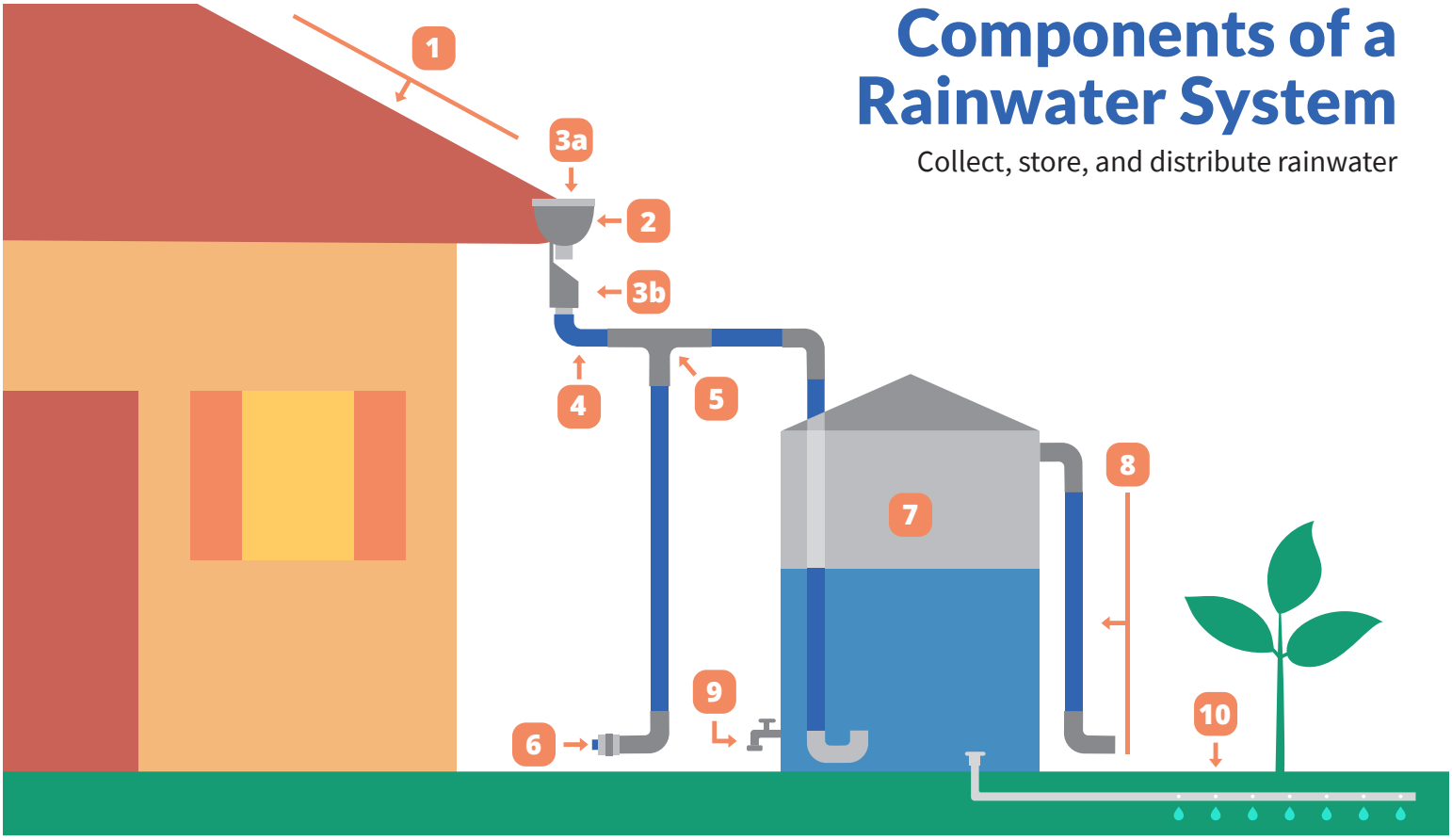
- Reduces municipal water demand and property owner's water bill
- Provides an unchlorinated source of water for plants, ponds, bird baths, fountains, and other water features
- Resolves some types of property drainage problems
- Captures fast-flowing stormwater, helping reduce area flooding, erosion, and water pollution in our creeks and river
- Might lower the monthly drainage fee on the property

Ready to Get a Cistern?

1. **Austin Water customers and qualifying water providers can apply for a rebate.** Find information in the "Rebates" section of www.austintexas.gov/gardengoodies.
2. **Choose the type of system you want:**
   a. If you want to distribute the water by a **hand-held hose, irrigation drip line, or watering can**, select a **non-pressurized system**. These systems are powered by gravity, and the water is released manually through the cistern's spigot.
   b. If you want to distribute the water using a **sprinkler system**, you'll need a **pressurized system**. These systems include a pump that creates pressure to push the water away from the cistern. This type of system requires a permitted backflow prevention device and yearly inspection fees, if the cistern holds more than 500 gallons.
3. **We recommend consulting with a professional to:**
   a. Determine the cistern type, size, and ideal location
   b. Help choose the components of the system
   c. Get a permit (if installing a pressurized system with a cistern holding more than 500 gallons)
   d. Build a sturdy foundation to hold the cistern
   e. Install the system
4. **You might be eligible for a Stormwater Management Discount.** Find more information at www.austintexas.gov/drainagediscount.

Components of a Rainwater System

Collect, store, and distribute rainwater



Collection

1 Collection Area: a hard surface, usually a roof, where rain falls and flows to the cistern

THE IDEAL ROOF IS:

- a clean surface made from painted enamel, metal, clay, or slate
- free of toxic materials like lead, fire retardants, or copper

You can collect water from an asphalt shingle roof to irrigate landscape plants, but it's not recommended for watering edible plants.

2 Gutter: a trough that runs along the bottom roof line, moving water from the roof to a downspout that leads to the cistern

Leaf and Debris Filter: Your system should include either or both **3a/3b**.

3a Gutter screen: a mesh cover that keeps leaves and debris from entering the gutter

3b Leaf filter: a filter that prevents leaves and other debris from entering the cistern

4 Downspout: a pipe that connects the gutter to the cistern

5 First flush diverter: a quality control device that directs the initial wash of rainwater, or "first flush," into a separate pipe, reducing the amount of dust, pollen, and debris that will flow to the cistern. Once the pipe has filled, cleaner water flows to the cistern.

6 First flush cap: a removable cap on the bottom of the first flush diverter

Storage

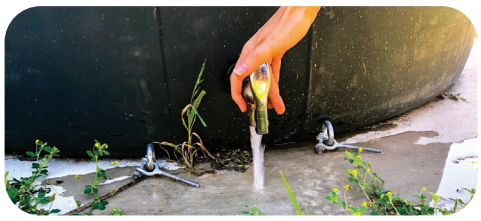
7 Cistern: a water storage container

Release

8 Overflow: a vertical pipe from an opening on top of the cistern that releases water to a yard, tree, rain garden, or other area when the cistern is full

WATER FOR WILDLIFE

If you would like, create a "wildlife spring" where birds, bees, and butterflies can drink! Run a 1/2 inch diameter pipe from the outlet of the cistern to a rock, close or cap the far end of the pipe, and then create a very small opening to allow a constant, slow trickle onto the rock.



9 Main outlet: a spigot used to release water from the cistern. From the outlet, you can release water into an irrigation drip line, a hose, watering can, or straight to the ground.

10 Passive irrigation drip line: a tube with small holes that allows water to slowly drain into the soil. You can attach this line to the main outlet or to a separate outlet. You can leave the line open for a continual, slow release of water or attach a timer to control when and how much water is released.

CONNECTING YOUR CISTERN TO AN IRRIGATION DRIP LINE?

- Be sure to include a fine (approximately 150 mesh) filter between the two so your system continues to work properly.
- You may consider burying the drip line underground to avoid a tripping hazard and protect the line from landscaping machinery.

Drain the Rain

When and how much water to release from the cistern will be based on your preference:

- **Make space in the cistern to collect water during the next rainstorm.** This will reduce drainage and erosion problems on your property and help protect local creeks, while reserving a portion of the water as a back-up supply for irrigating plants. Drain some water whenever rain is forecasted, or routinely release water from your cistern. For example, you can set up a slow-release irrigation drip line to a tree or garden and install an irrigation timer to manage the amount of time that water is released.
- **Release water from the cistern only when needed for landscaping.** This will maximize the amount of water available for your landscape.

HOW CAN YOU TELL HOW MUCH WATER IS IN THE CISTERN?

You can install a gauge or a view tube; however, tapping on the side of the cistern and listening for a hollow sound above the waterline is the simplest method.

Maintaining Your System

For all routine maintenance and troubleshooting, hire professionals as needed.
Never enter a cistern if you don't have the proper confined spaces training!

Routine Maintenance

FREQUENCY	STEPS TO TAKE	TOOLS NEEDED
4X PER YEAR Seasonally	• Clean any filter between the cistern and the irrigation system.	• None
	• Drain the first flush diverter line.	• Wrench
2X PER YEAR Spring & Fall	• Remove debris from roof, gutters, screens, and filters.	• Ladder • Gloves (for gutter) • Broom or brush
	• Prune back trees and shrubs that contribute to leaf litter clogging the system.	• Pruning tools
EVERY 1 TO 5 YEARS	• Visually check for sediment in the bottom of the cistern.	• Ladder • Flashlight

	• If sediment is detected:
	  • Open the lowest water release outlet.
	  • From an access point at the top of the cistern, use a long-handled tool to stir up the sediment.
	  • Rinse the cistern.
	If additional cleaning is needed, hire a professional to scrub and remove sediment that can not be sprayed out.
		• Long-handled tool, like a broom or mop
		• Hose with spray nozzle

When Cistern Contains Water (Optional)	• To reduce onsite erosion and drainage problems, make sure the cistern has space available to capture more rain. Open the main outlet and drain water to the desired level.	• None

Troubleshooting

PROBLEM	STEPS TO TAKE	TOOLS NEEDED
 **WATER IS NOT RELEASING from the Cistern**	• Check to see that the water level is higher than the outlet.	• None
	• Check that the outlet is open.	• None
	• Remove debris from gutters, gutter screens, filters, irrigation lines, first flush diverter, and outlet connections.	• Ladder • Gooseneck pliers • Flashlight • Broom • Gloves
 **The Cistern is UNEVEN**	• Empty the cistern and move it from the foundation. • Prepare a level and compacted foundation. • Move cistern back in place.	• Level • Foundation supplies and tools
 **The Cistern WATER SMELLS**	• Drain the cistern. From the top, use a long-handled tool to agitate the bottom of the cistern as the water is draining.	• Eco-friendly cleaning solution • Long-handled tool, like a broom or mop
	• Visually check for tears in all filter screens and clean out first flush diverter.	• Ladder
	• If gutters are clogged with debris, remove debris and install gutter screens.	• Ladder • Installation tools for screens • Gloves (to remove debris)
	• Check for rotting debris inside the cistern. If found, remove and then repair holes.	• Appropriate patching materials and tools
 **The Cistern is NOT CAPTURING WATER**	• Remove debris from gutters, gutter screens, filters, and first flush diverter.	• Ladder • Gloves
	• Check connections to gutters, pipes, and downspouts leading to cistern.	• Ladder • Gooseneck pliers
	• Inspect cistern for leaks by looking for cracks or holes in the system or wet spots around the system. Repair any leaks found.	• Appropriate patching material and tools
 **MOSQUITOES (AND LARVAE) Near or Inside Cistern**	• Check filters and screens for openings where mosquitoes can enter. Repair or replace any damaged filters and screens.	• Ladder • Flashlight
	• If water is collecting around the cistern, look for the source of water. Repair cracks or leaks.	• Supplies and tools needed to repair cracks or leaks
	• Visually inspect the water in the cistern for mosquito larvae. If you see them, add mosquito dunks to the water.	• Ladder • Flashlight • Mosquito dunks
	• Find more tips to reduce mosquito populations around the property.	• Mosquitoes Fact Sheet (www.GrowGreen.org)

THE LOOK OF YOUR LANDSCAPE

If a large cistern isn't part of your ideal aesthetic, you can use artistic or natural designs to integrate it!

Ideas include: **(1)** paint the cistern to match the house or other adjacent structure, **(2)** paint a mural on the cistern, **(3)** hide the cistern behind a vine-covered trellis or a beautiful wall, **(4)** plant a fence row of native or adapted plants in front of it.

You may be able to have the cistern installed underground (depending on the soil type or rock present) or under the house, if space is available.

www.growgreen.org

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